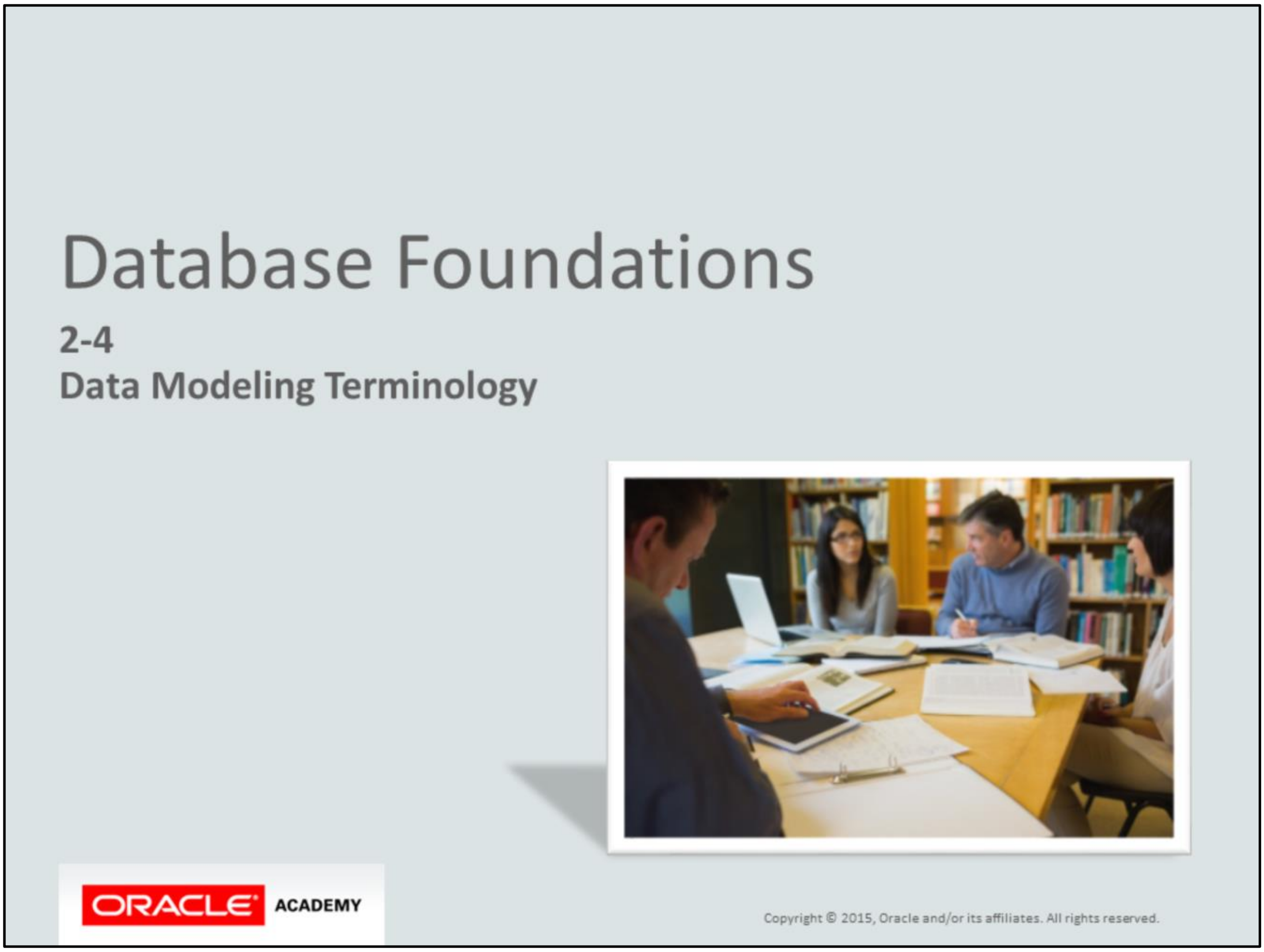
ORACLE® ACADEMY

Release Date: September, 2015

Updates:



Database Foundations

2-4
Data Modeling Terminology

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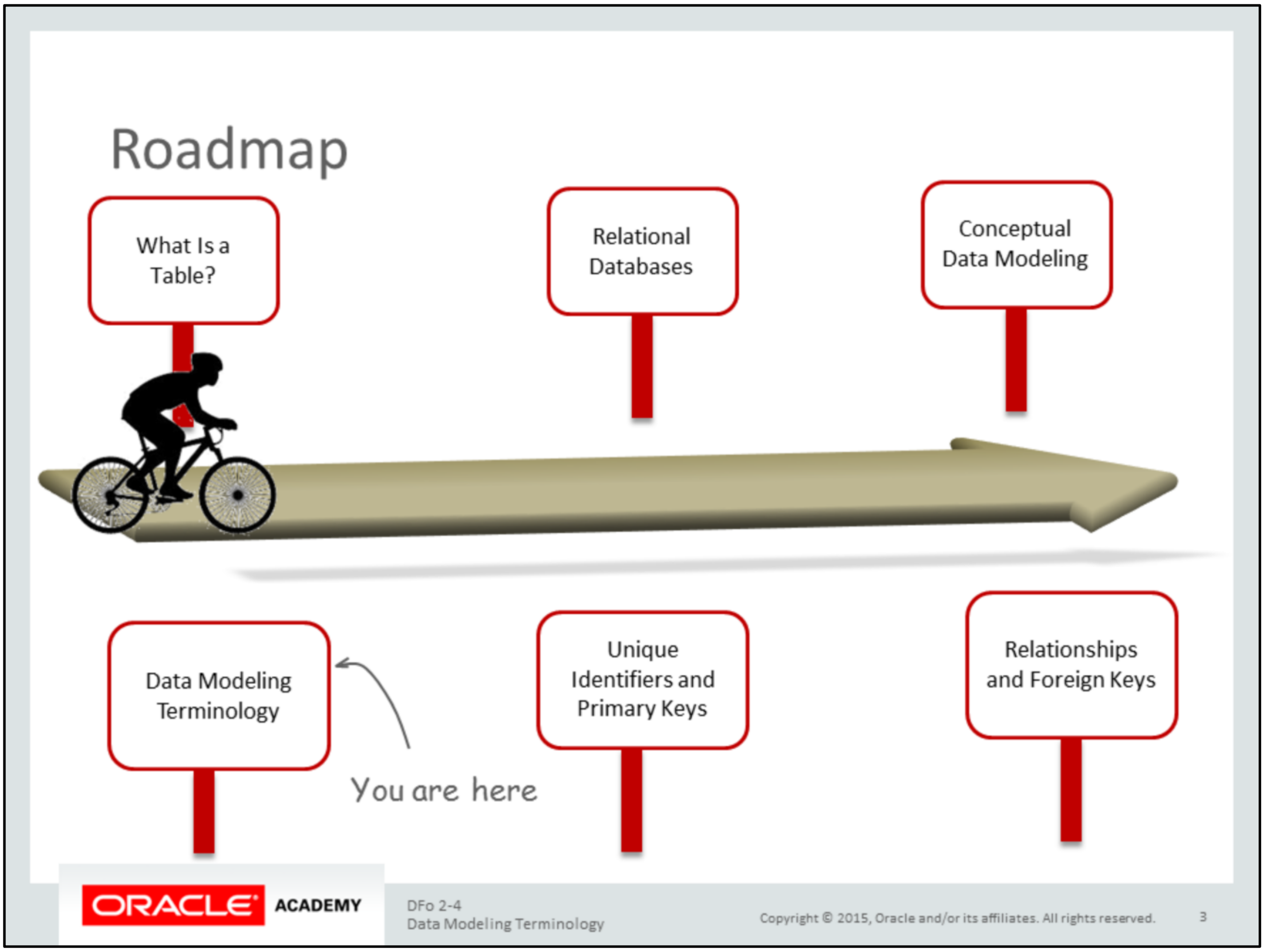


Roadmap

What Is a Table?

Relational Databases

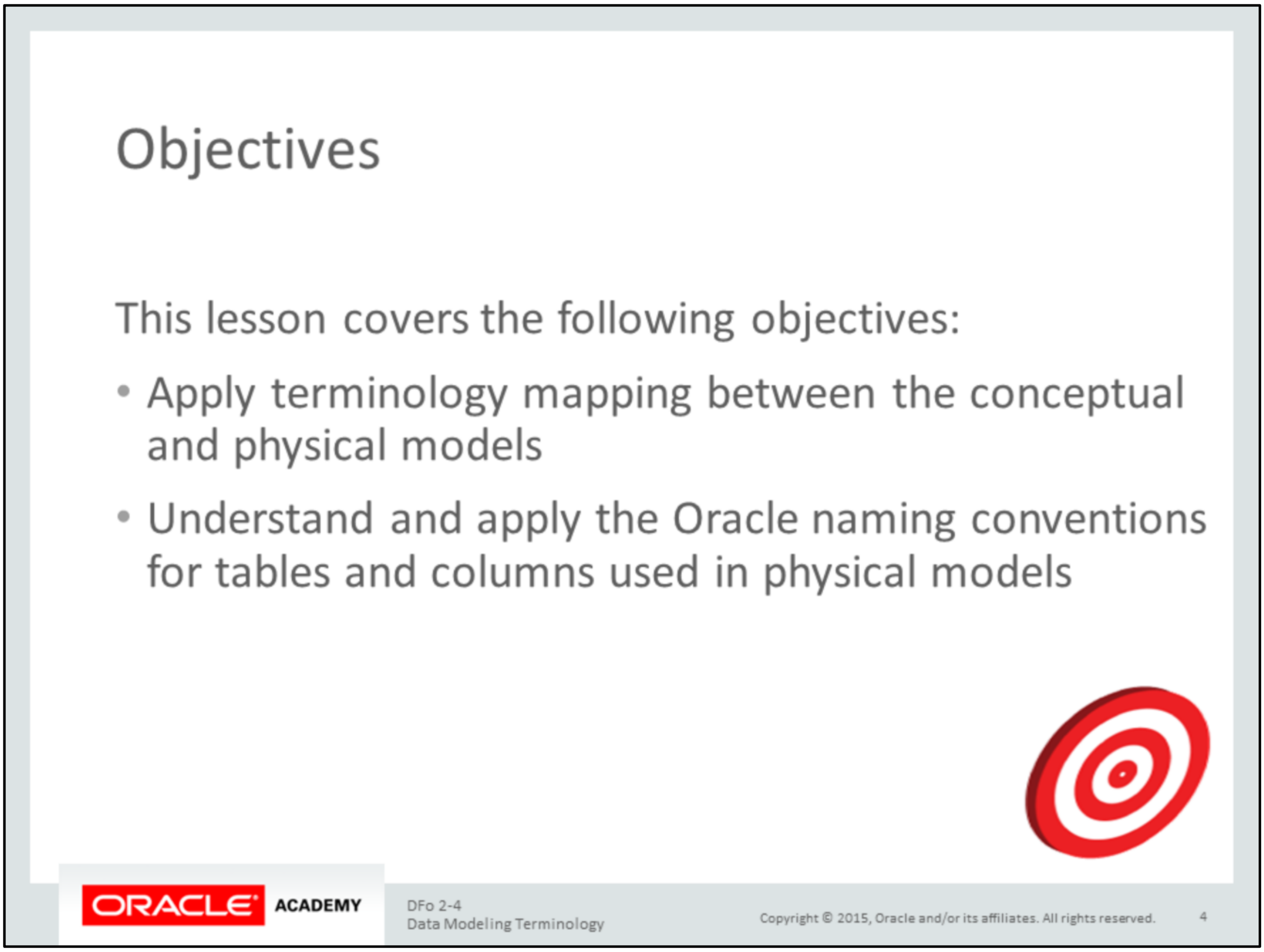
Conceptual Data Modeling

Data Modeling Terminology

You are here

Unique Identifiers and Primary Keys

Relationships and Foreign Keys



Objectives

This lesson covers the following objectives:

- Apply terminology mapping between the conceptual and physical models
- Understand and apply the Oracle naming conventions for tables and columns used in physical models

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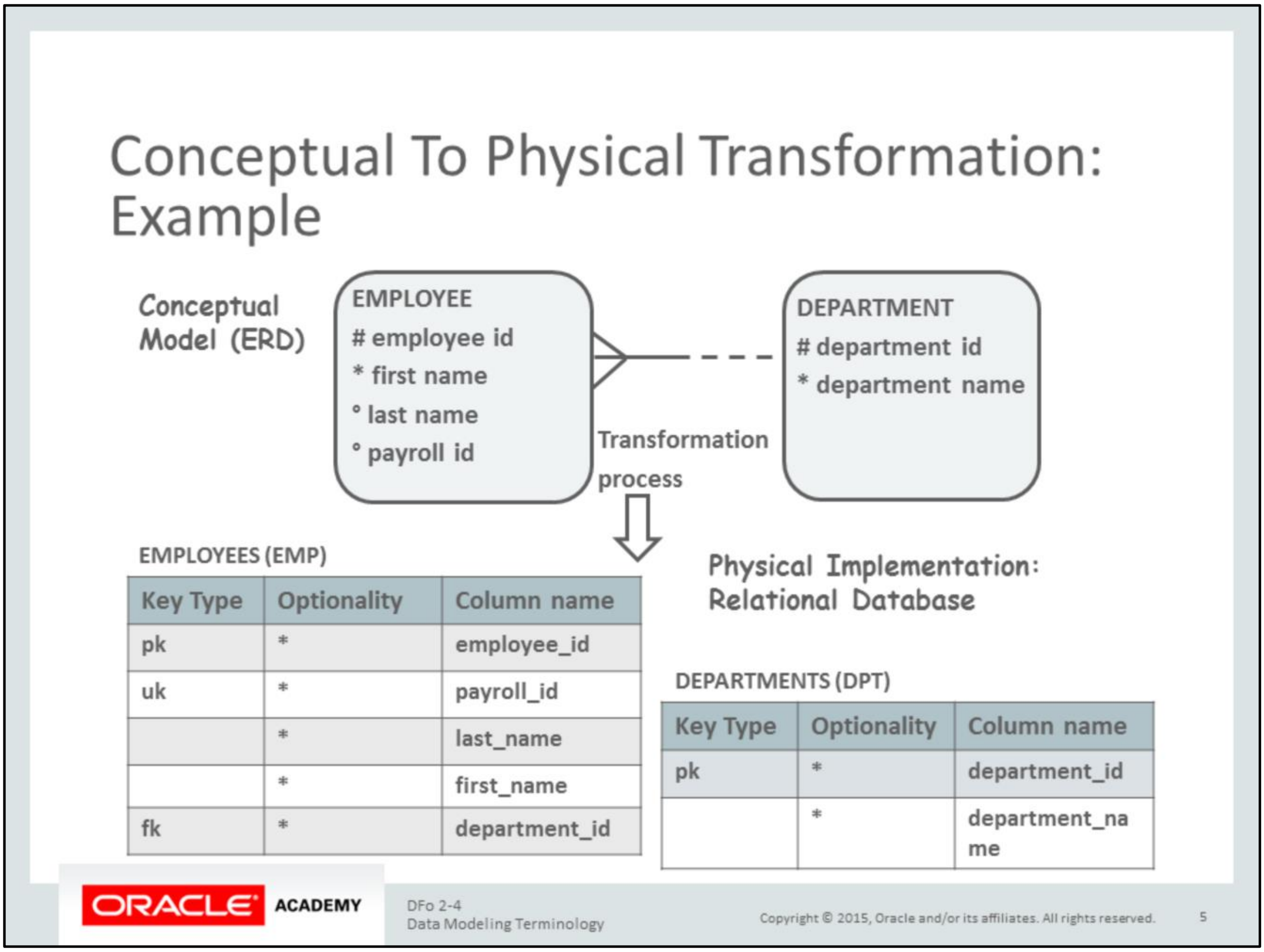
Data Modeling Terminology



Conceptual To Physical Transformation: Example

Conceptual Model (ERD)

EMPLOYEE
# employee id
* first name
° last name
° payroll id

DEPARTMENT
# department id
* department name

Transformation process

Physical Implementation: Relational Database

EMPLOYEES (EMP)

Key Type	Optionality	Column name
pk	*	employee_id
uk	*	payroll_id
	*	last_name
	*	first_name
fk	*	department_id

DEPARTMENTS (DPT)

Key Type	Optionality	Column name
pk	*	department_id
	*	department_name

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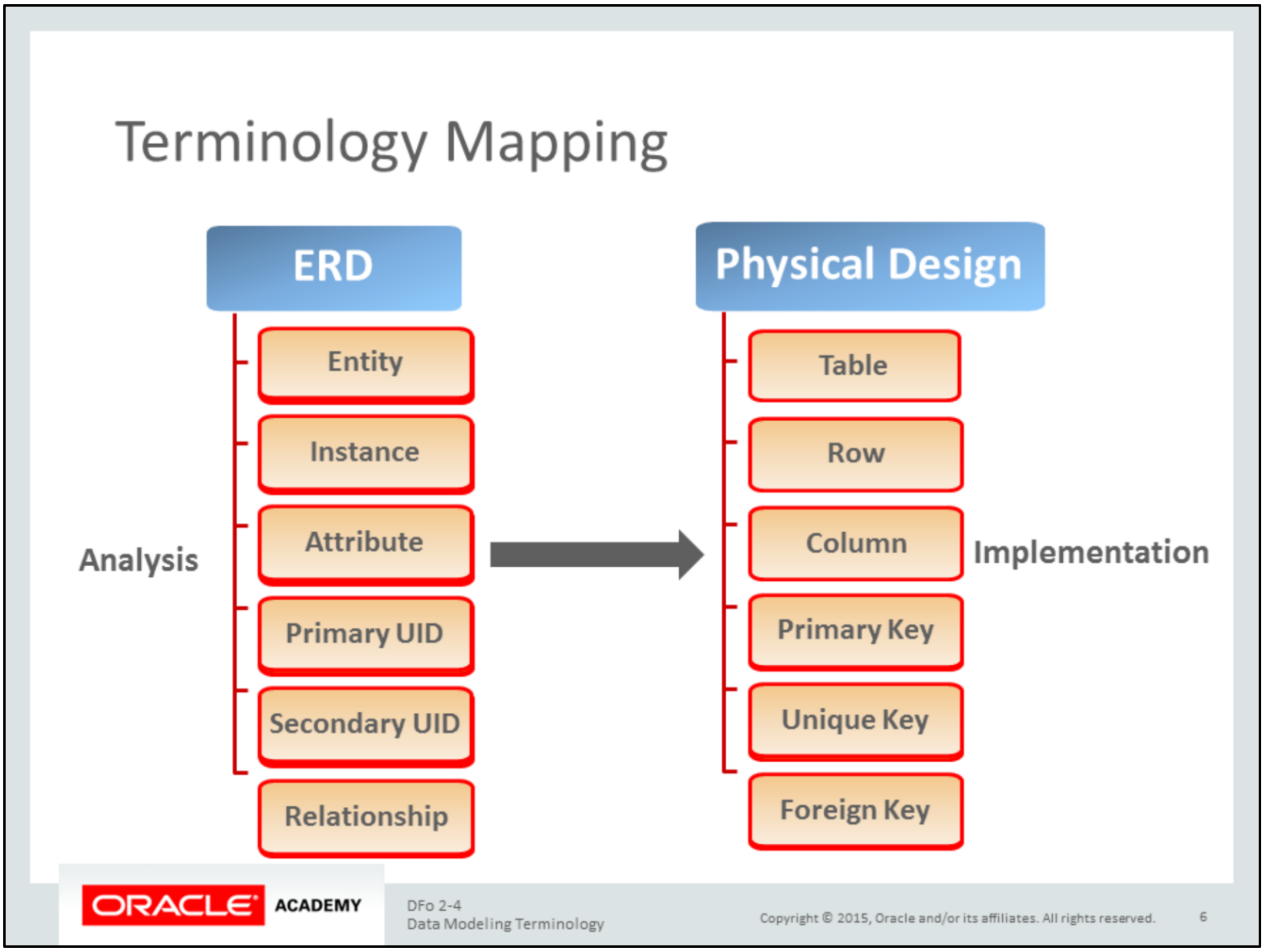
The conceptual model (ERD) is transformed into a physical model. The physical implementation will be a relational database.



Terminology Mapping

ERD

Physical Design

Analysis

Entity

Instance

Attribute

Primary UID

Secondary UID

Relationship

Table

Row

Column

Primary Key

Unique Key

Foreign Key

Implementation

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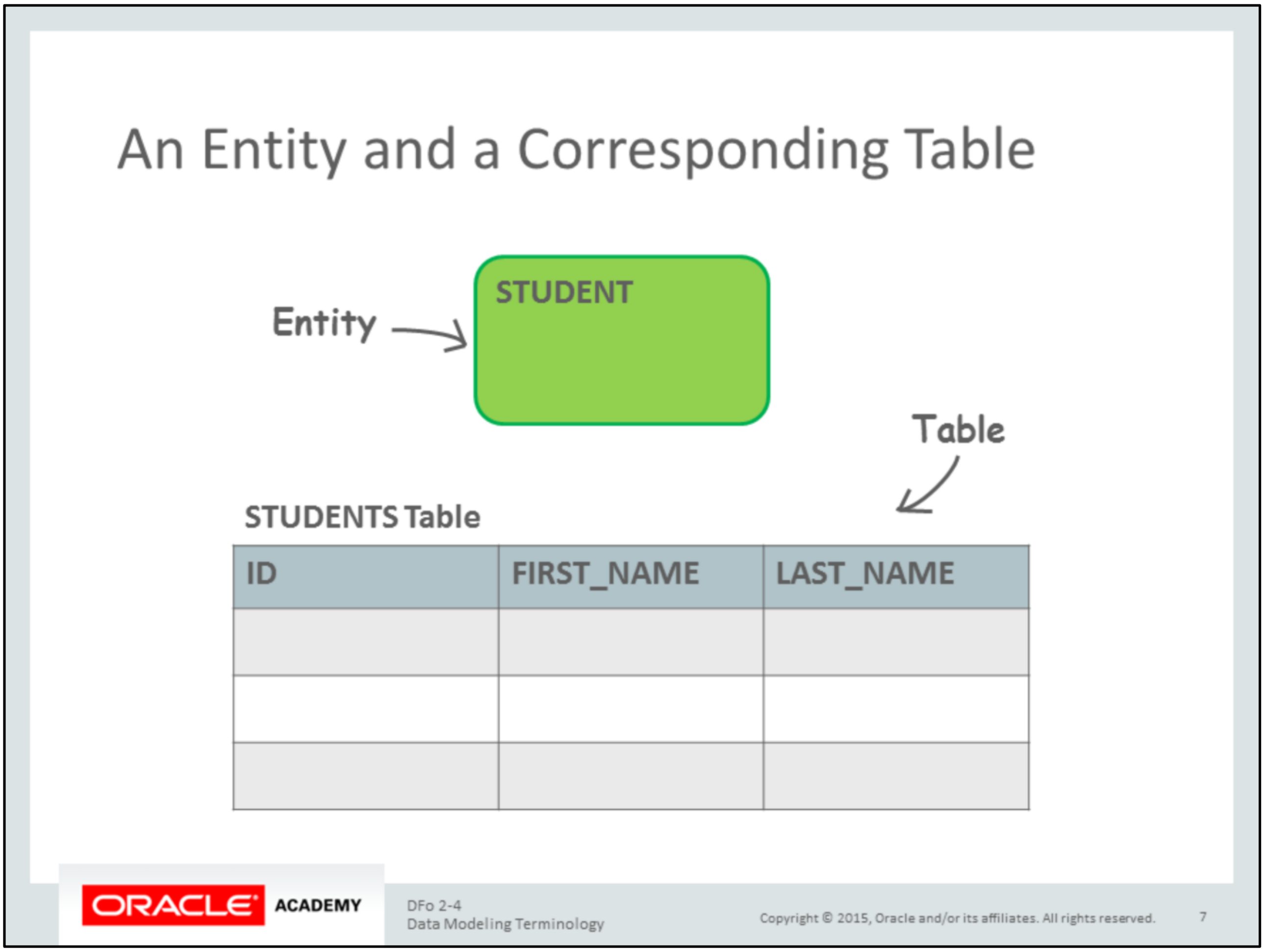
Changing from analysis (conceptual model) to implementation (physical model) also means changing terminology:

- An entity becomes a table.
- An instance becomes a row.
- An attribute becomes a column.
- A primary UID becomes a primary key.
- A secondary UID becomes a unique key.
- A relationship is transformed into a foreign key column and a foreign key constraint.



An Entity and a Corresponding Table

Entity

STUDENT

Table

STUDENTS Table

ID	FIRST_NAME	LAST_NAME

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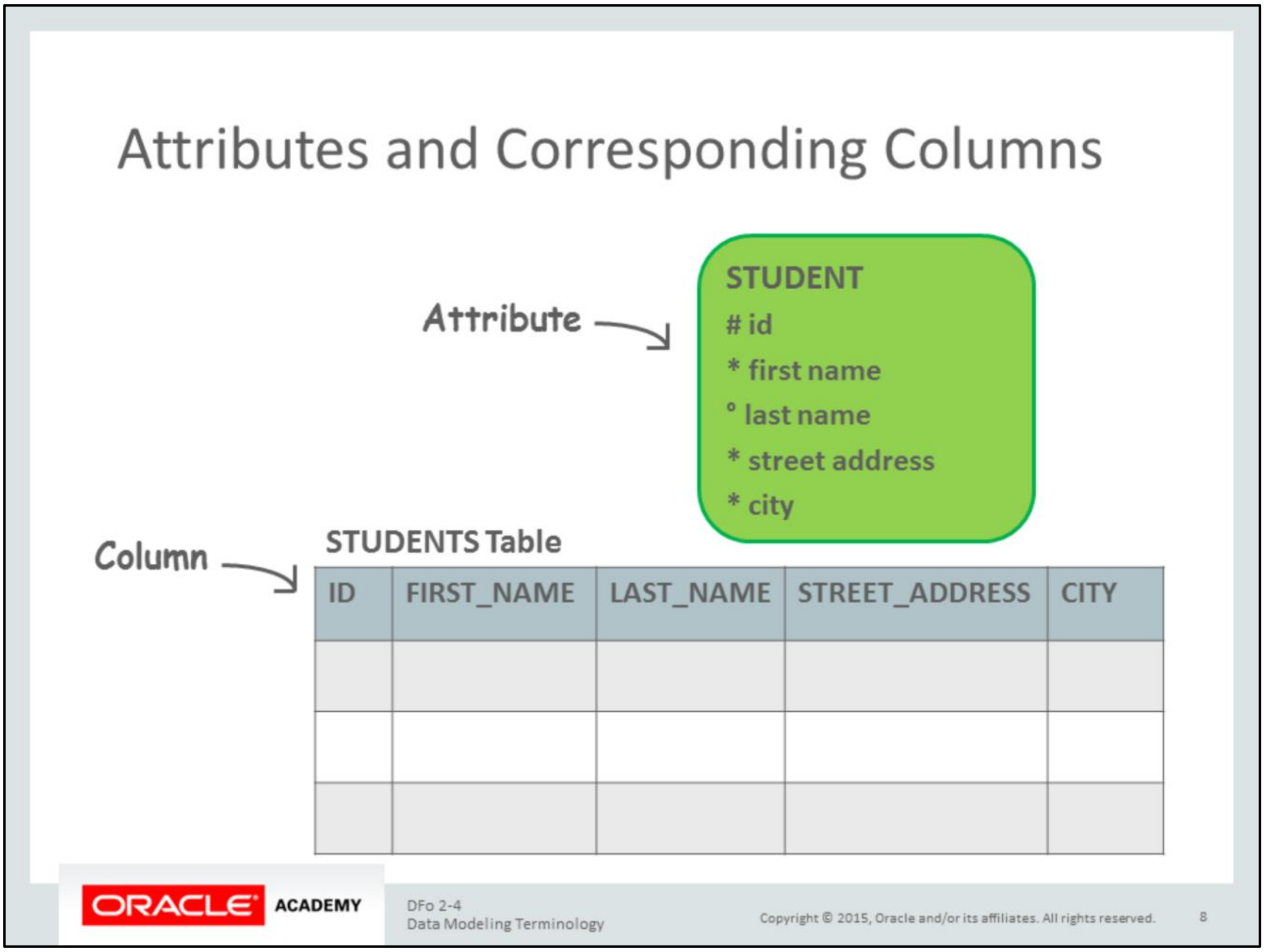
In the slide example, a single entity called `STUDENT` is defined. This entity represents or corresponds to a single table of data that must be maintained by the system.



Attributes and Corresponding Columns

Attribute

STUDENT
# id
* first name
° last name
* street address
* city

Column

STUDENTS Table

ID	FIRST_NAME	LAST_NAME	STREET_ADDRESS	CITY

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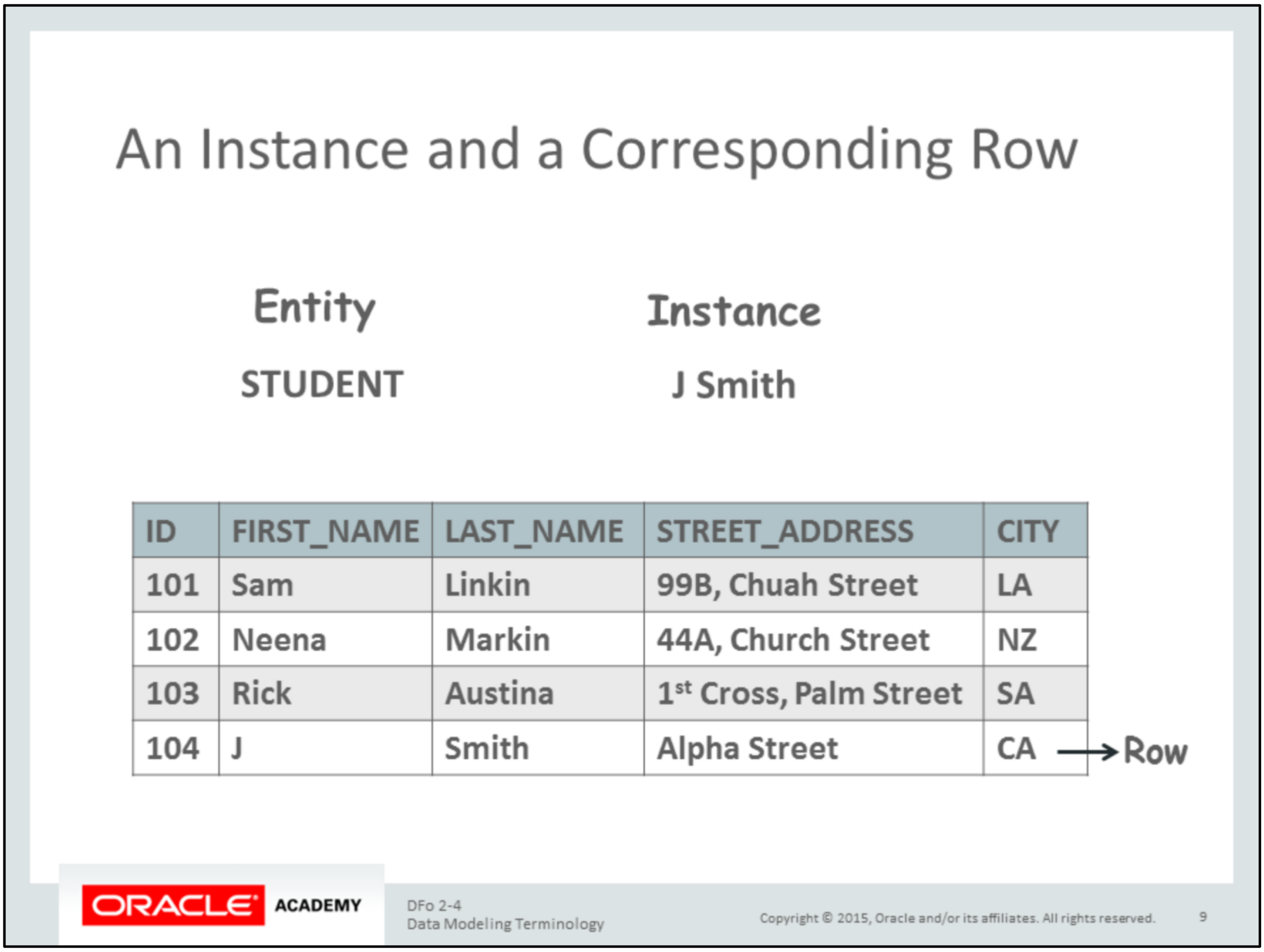
It is important to learn about attributes because they provide more information about the entities. Attributes help you be more specific about the data that you need to track.

In the slide example, the STUDENT entity has five attributes, and so the STUDENTS table has five columns:

- a column of ID numbers, with no ID number appearing more than once in it
- a column of first names of students
- a column of last names of students
- a column of street addresses of students
- A column of cities of students

Attributes are classified as one of the following:

- **Not null (mandatory):** Indicated by the asterisk (*) symbol next to the attribute
- **Optional (nulls allowed):** Indicated by the o (optional) symbol next to the attribute



An Instance and a Corresponding Row

Entity

STUDENT

Instance

J Smith

ID	FIRST_NAME	LAST_NAME	STREET_ADDRESS	CITY
101	Sam	Linkin	99B, Chuah Street	LA
102	Neena	Markin	44A, Church Street	NZ
103	Rick	Austina	1st Cross, Palm Street	SA
104	J	Smith	Alpha Street	CA

→ Row

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Entities have instances. An instance is a single occurrence of an entity. Some entities have many instances, and some have only a few.

In the slide example, J Smith is an instance of the STUDENT entity. And in the STUDENTS table, J Smith's ID, first name, last name, street address, and city are stored in one row.

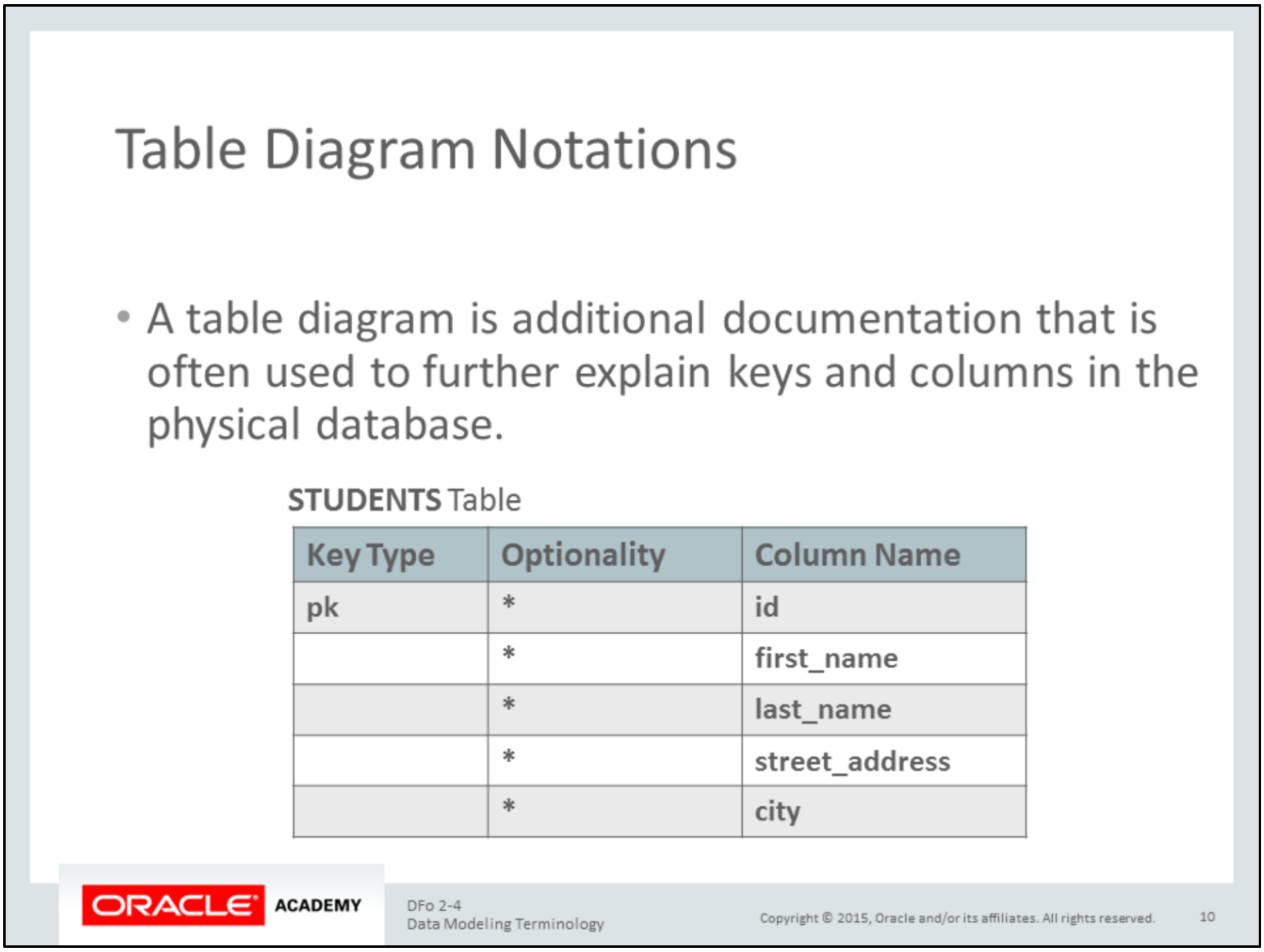


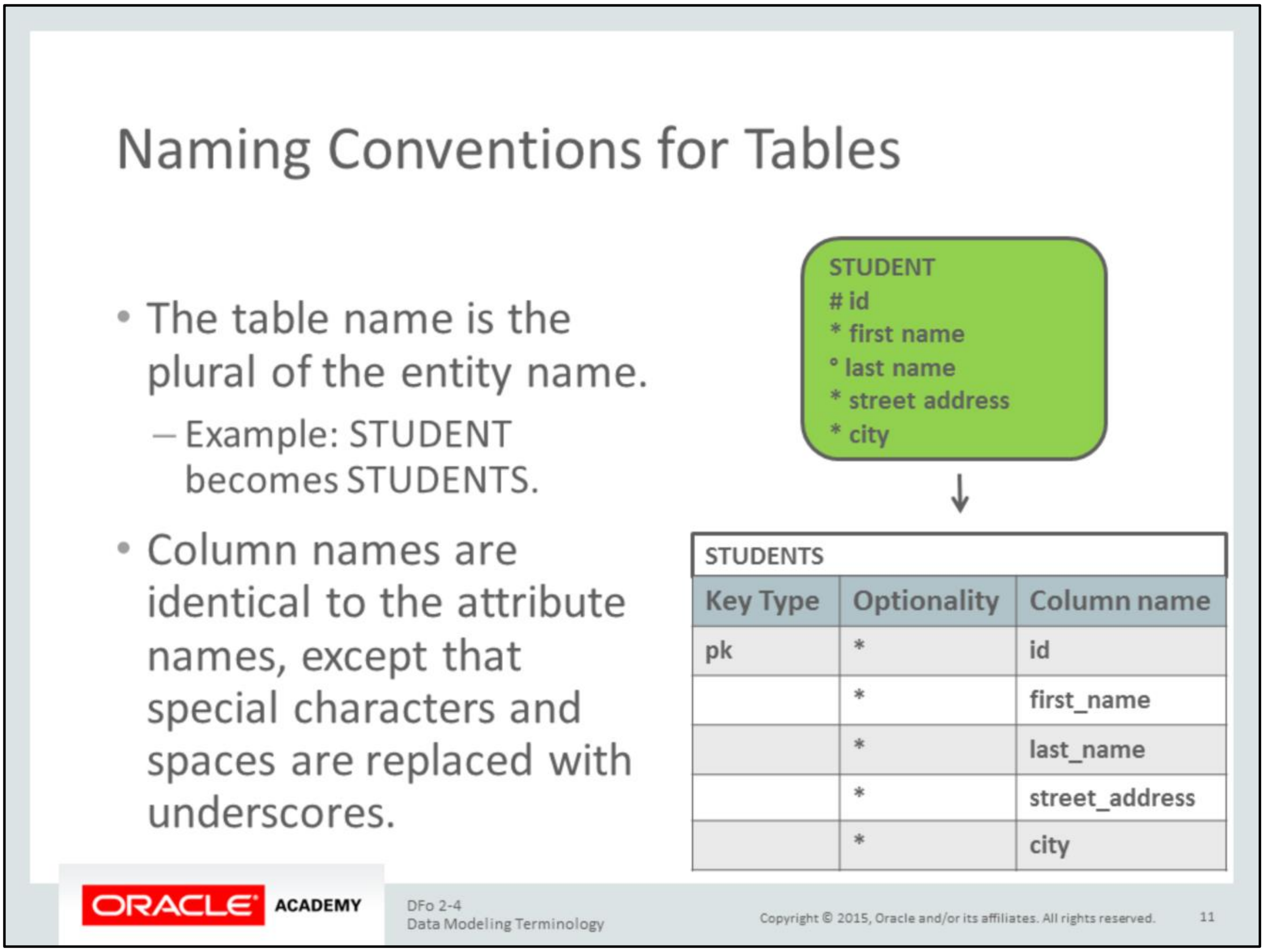
Table Diagram Notations

- A table diagram is additional documentation that is often used to further explain keys and columns in the physical database.

STUDENTS Table

Key Type	Optionality	Column Name
pk	*	id
	*	first_name
	*	last_name
	*	street_address
	*	city

- The first row of the table diagram contains the table name and the short name.
- The Key Type column should contain values of "pk" for the primary key, "uk" for the unique key, or "fk" for the foreign key column. The cell is blank if the column is not a part of a key.
- The Optionality column must contain an asterisk (*) if the column is mandatory and a lowercase "o" if it is optional. This is similar to the ERD.
- The third column is for the column name.



Naming Conventions for Tables

- The table name is the plural of the entity name.
  - Example: STUDENT becomes STUDENTS.
- Column names are identical to the attribute names, except that special characters and spaces are replaced with underscores.

STUDENT
# id
* first name
° last name
* street address
* city

↓

STUDENTS

Key Type	Optionality	Column name
pk	*	id
	*	first_name
	*	last_name
	*	street_address
	*	city

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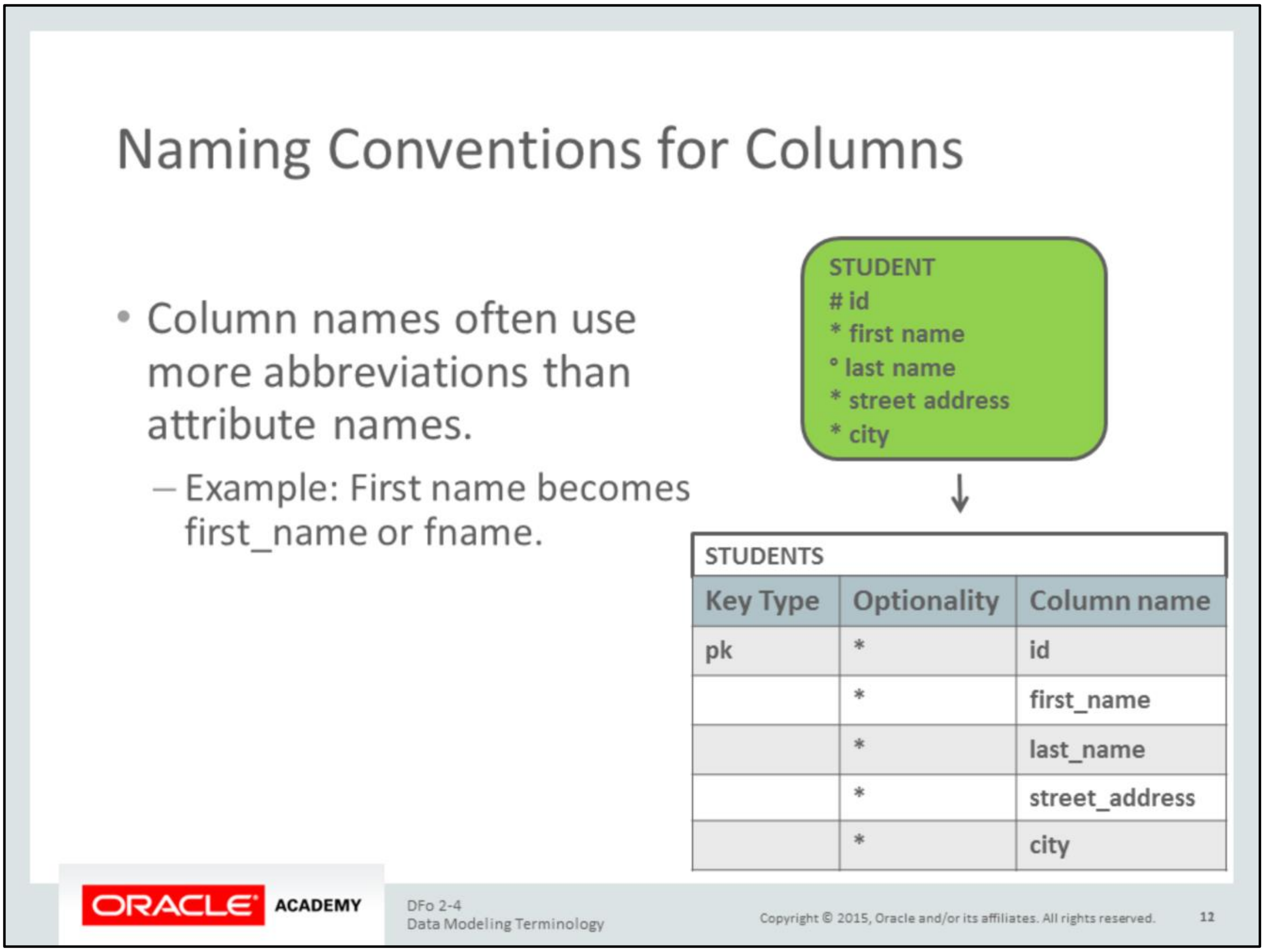

Naming Conventions for Columns

- Column names often use more abbreviations than attribute names.
  - Example: First name becomes first_name or fname.

STUDENT
# id
* first name
° last name
* street address
* city

↓

STUDENTS

Key Type	Optionality	Column name
pk	*	id
	*	first_name
	*	last_name
	*	street_address
	*	city

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Column names are identical to the attribute names except that special characters and spaces are replaced with underscores.

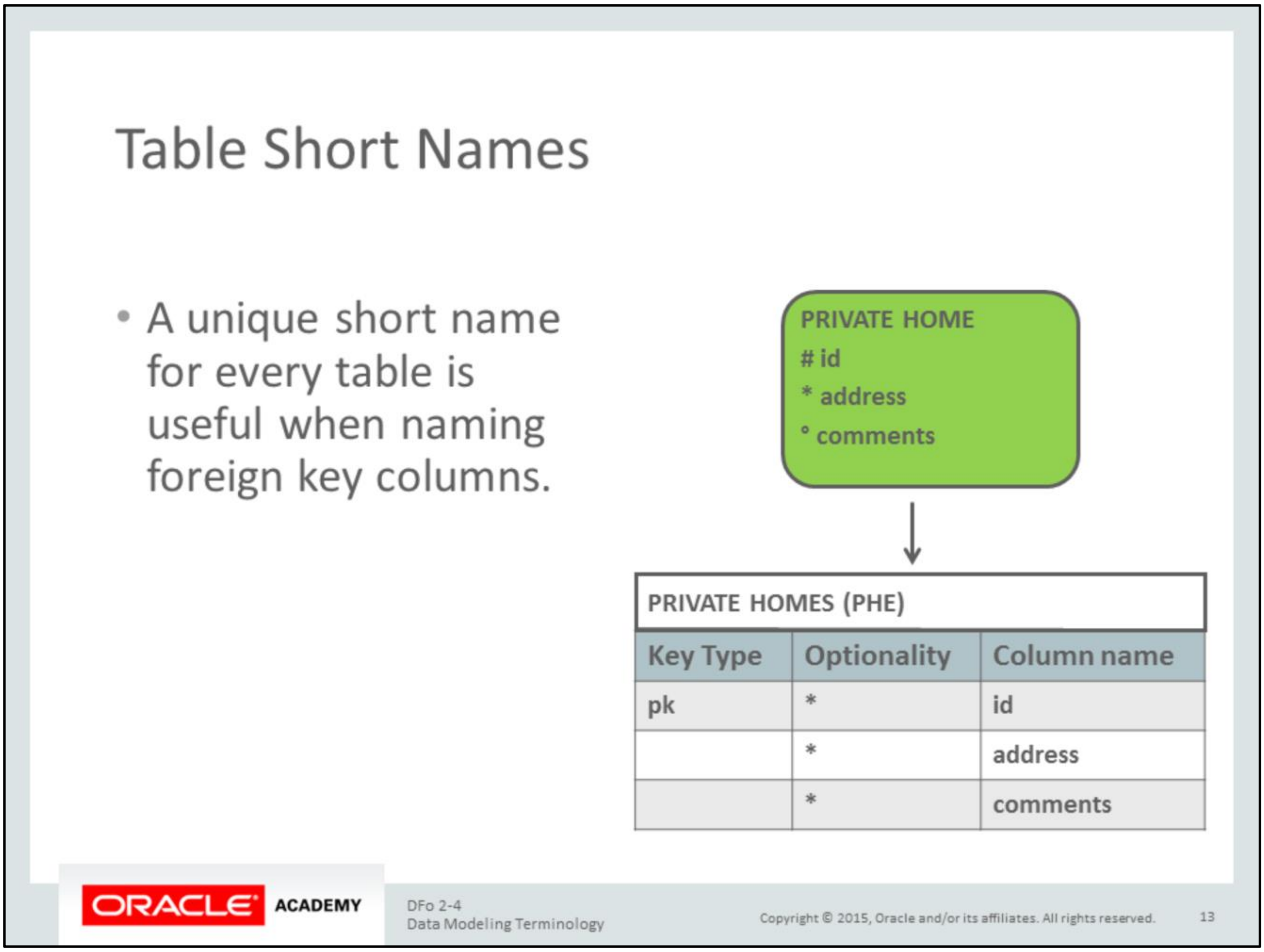

Table Short Names

- A unique short name for every table is useful when naming foreign key columns.

PRIVATE HOME
# id
* address
° comments

PRIVATE HOMES (PHE)

Key Type	Optionality	Column name
pk	*	id
	*	address
	*	comments

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For entity names that contain more than one word, take the:

- First character of the first word
- First character of the second word
- Last character of the last word

Example: PRIVATE HOME gets a short name of PHE.

For entity names that contain one word but more than one syllable, take the:

- First character of the first syllable
- First character of the second syllable
- Last character of the last syllable

Example: EMPLOYEE gets a short name of EPE and CLIENT gets a short name of CET.

For entity names that contain one syllable but more than one character, take the:

- First character
- Second character
- Last character

Example: FLIGHT gets a short name of FLT.

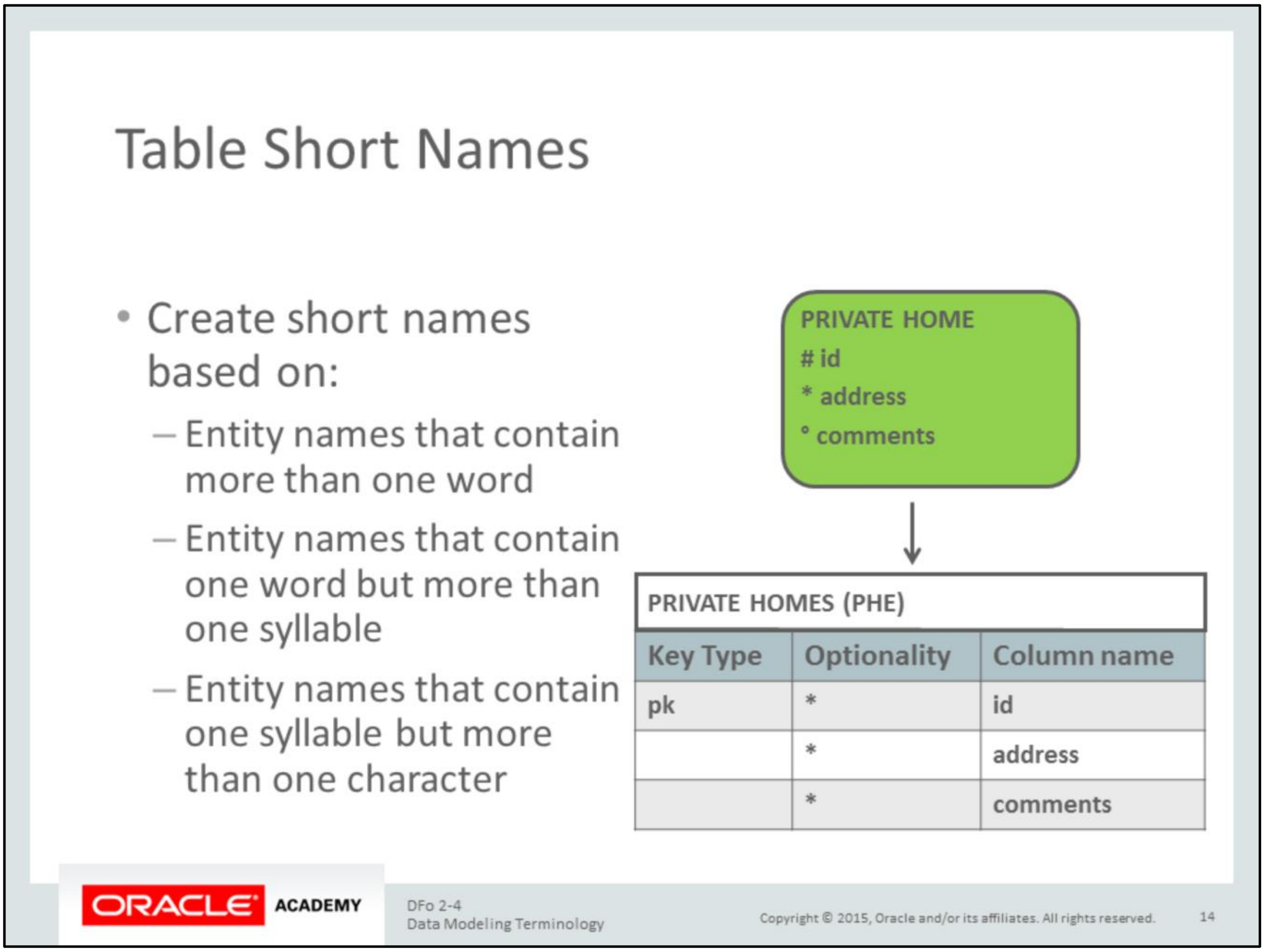

Table Short Names

- Create short names based on:
  - Entity names that contain more than one word
  - Entity names that contain one word but more than one syllable
  - Entity names that contain one syllable but more than one character

PRIVATE HOME
# id
* address
° comments

PRIVATE HOMES (PHE)

Key Type	Optionality	Column name
pk	*	id
	*	address
	*	comments

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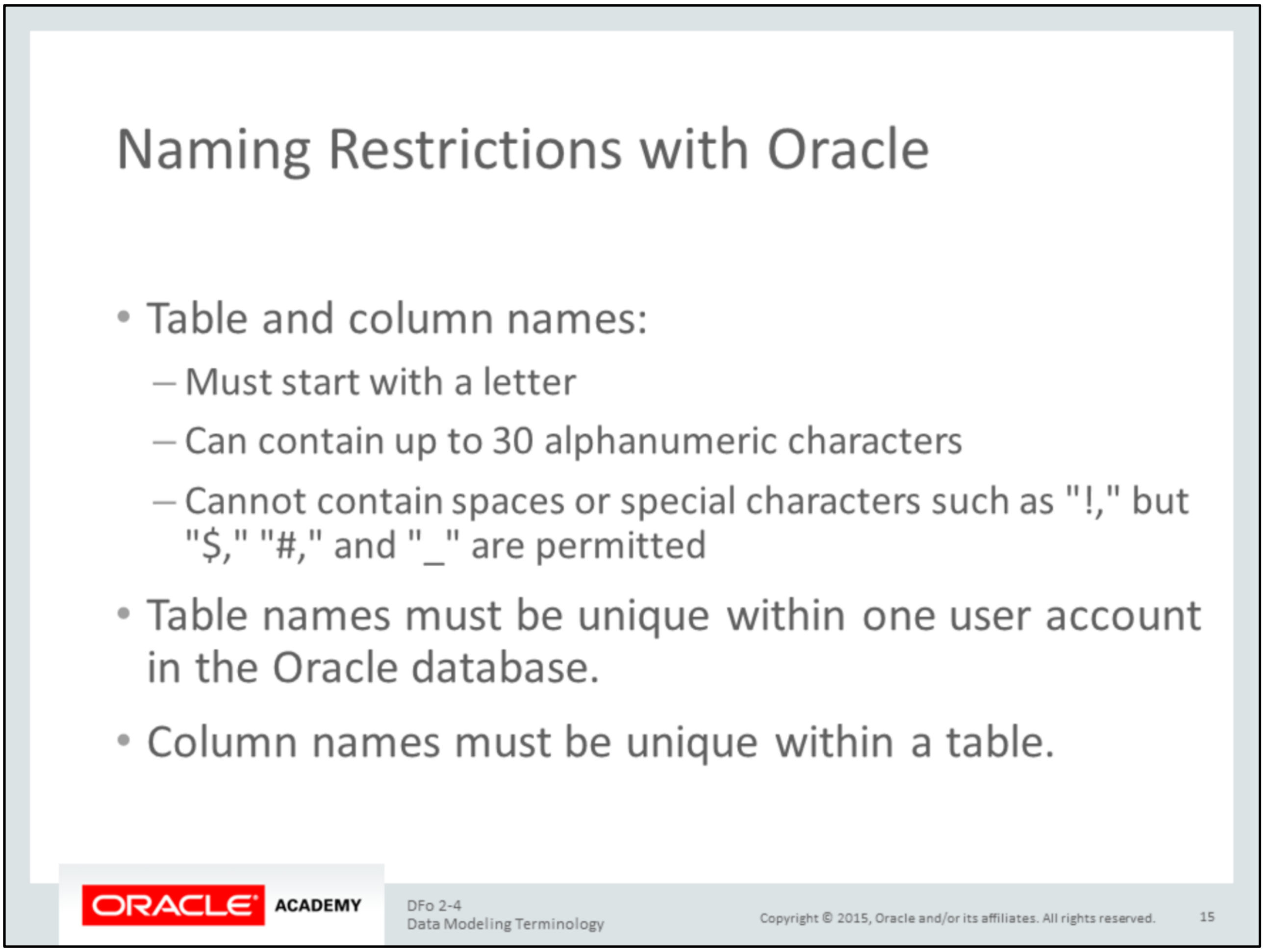

Naming Restrictions with Oracle

- Table and column names:
  - Must start with a letter
  - Can contain up to 30 alphanumeric characters
  - Cannot contain spaces or special characters such as "!," but "$," "#," and "_" are permitted
- Table names must be unique within one user account in the Oracle database.
- Column names must be unique within a table.

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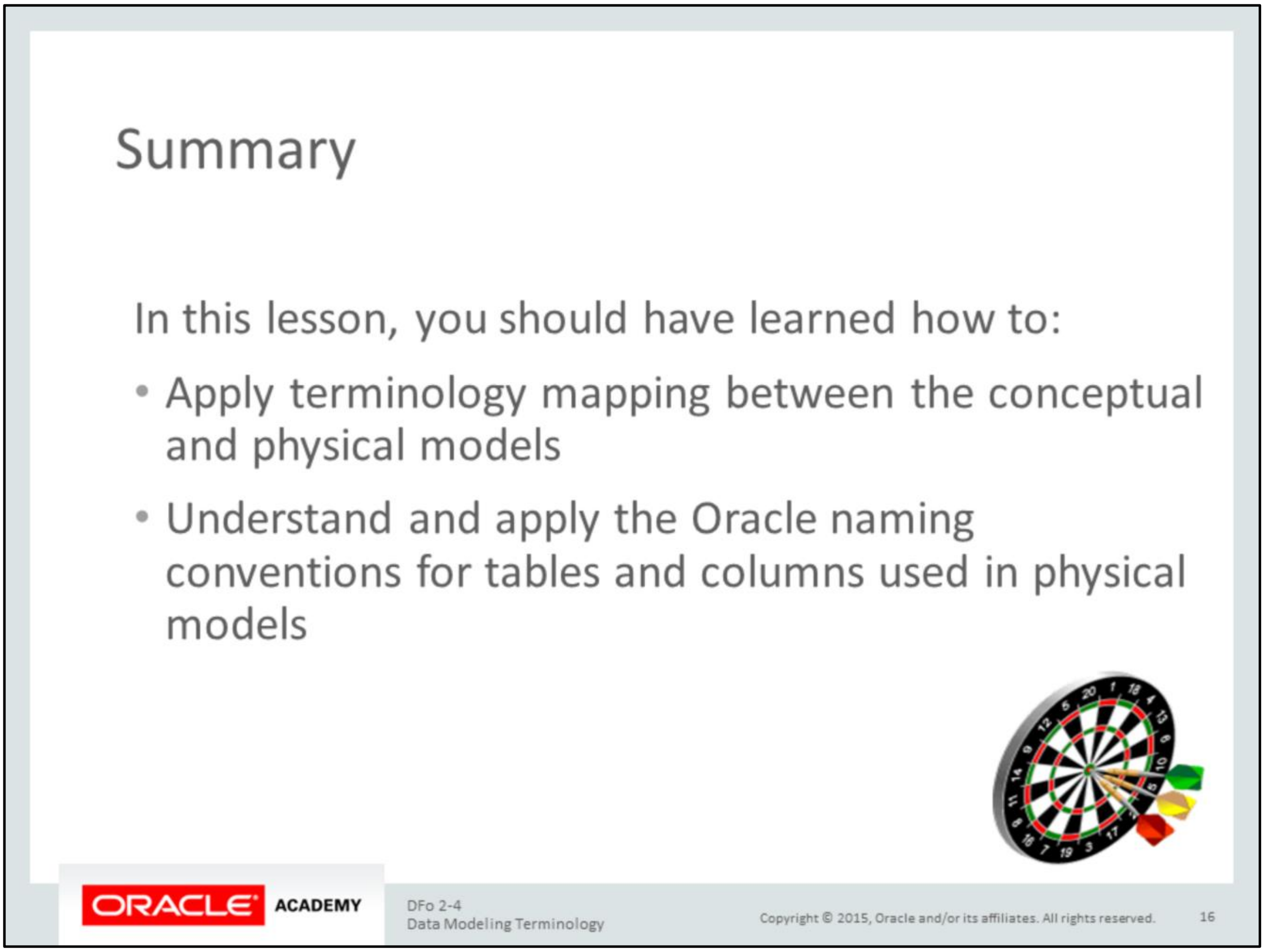
Some words have a special meaning in the Oracle database and in the SQL programming language. These words are called “reserved words.” It is best to avoid using these as names for your tables and columns.

Some common examples of Oracle reserved words are:

- `TABLE`
- `NUMBER`
- `SEQUENCE`
- `ORDER`
- `VALUES`
- `LEVEL`
- `TYPE`

A complete list is on otn.oracle.com.



Summary

In this lesson, you should have learned how to:

- Apply terminology mapping between the conceptual and physical models
- Understand and apply the Oracle naming conventions for tables and columns used in physical models

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